

# SIGNAL ANALYZERS

## Spectrum Analyzer, 50 kHz to 22 GHz

### Model 8592A

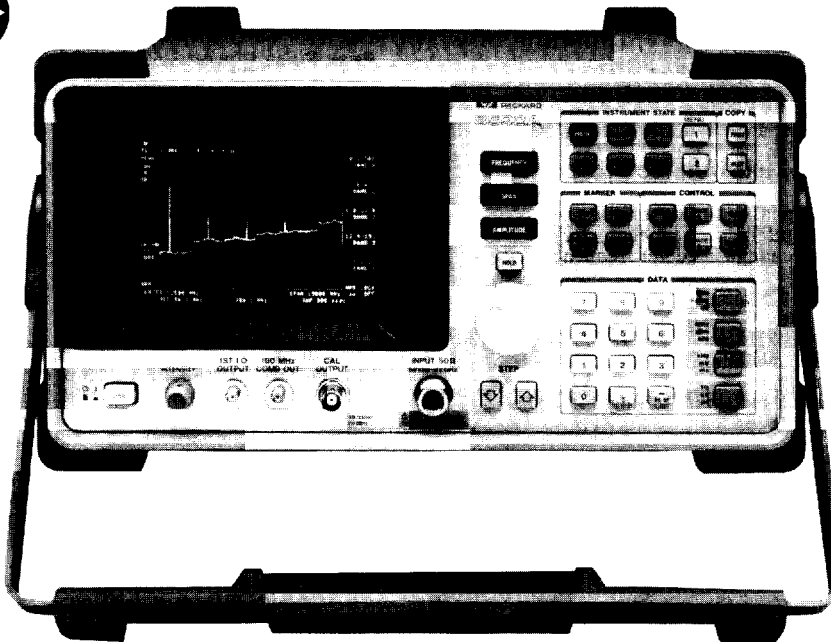
137

- Built-in 100 MHz comb generator
- Programmable via HP-IB, RS232C, or HP-IL
- Direct printer and plotter output

- Internal preselection, 2.75 to 22 GHz
- Personalities—Digital Radio and CATV
- Optional 25 GHz operation



HP 8592A



### HP 8592A Portable Microwave Spectrum Analyzer

Never before could you get so much from a portable microwave spectrum analyzer for so small an investment. The HP 8592A is loaded with features and benefits that don't just help you make measurements, but help you make them more easily and more conveniently. The analyzer's wide frequency range (50 kHz to 22 GHz) and amplitude range (-109 dBm to +30 dBm) enable you to make almost any RF and microwave measurement.

An internal preselector eliminates the worry about identifying signals that exist with unpreselected microwave analyzers. A built-in comb generator significantly improves frequency accuracy, especially in the upper frequency range. And if you want programmability, this analyzer's got it. Over 100 different functions are programmable over three different interfaces, allowing you to use a wide variety of computers. Whether your needs are in the field or in the factory, the HP 8592A has so much to offer that you can't afford to be without it.

### It's Easy—Just Push a Button and Turn the Knob

Unquestionably the HP 8592A is one of the easiest spectrum analyzers you'll ever operate whether you are an experienced or a first-time user. Simply use the spectrum analyzer's three main control keys and its data-entry knob or key pad to measure any signal. The analyzer automatically adjusts internal parameters such as resolution bandwidth, video bandwidth, sweep time, IF gain, and input attenuation. You won't waste any time figuring out its operation.

Frequently-used functions are built into dedicated keys, and for additional measurement capability, display-menu softkeys give you nearly 100 more analysis and measurement functions. Easy-to-read control settings surround the graticule, and you can add a 50-character label at the top of the screen to identify traces and to get hardcopy data using HP printers and plotters.

### Powerful New Functions

Many functions previously available only in our high-performance spectrum analyzers are available in our portable analyzers, including

the HP 8592A. With markers, the analyzer will automatically indicate the signal amplitude and frequency, sparing you from visually interpolating between graticule lines. Trace functions offer a multitude of display manipulations. You can store and recall up to nine different analyzer settings and five trace displays in non-volatile memory. The CORRECT TO COMB function can be used to get  $\pm 2.7$  MHz frequency accuracy at 22 GHz, and even better accuracy at lower frequencies and smaller spans. Just temporarily connect the built-in, 100 MHz comb generator, press the CORRECT TO COMB softkey, and use the markers to read the corrected frequency. Special functions perform complex measurements such as percent AM, 99% power bandwidth, and 3- or 6-dB points. The FFT (Fast Fourier Transform) function measures AM sidebands such as power-line hum, even though the sidebands may be less than the minimum resolution bandwidth of 1 kHz.

### Lightweight and Portable

Weighing only 15 kg (33 lb), the HP 8592A does what you need at any location. Its small, compact size and light weight make it ideal for moving between lab benches or transporting to remote sites. Like other portable HP analyzers, it fits under an airplane seat.

### HP 8592A Option H25 25 GHz Operation

Option H25 extends the upper limit of the HP 8592A's frequency range to 25 GHz.

### HP 8592A Option H50 CATV Functions

Similar to HP 8590A Option H50 (see page 134).

### HP 8592A Option H52 Digital Radio

This option adds functions and capability for making easy measurements on digital radio signals. A compare-to-mask function makes a mean power measurement and then compares the result to the mask. The mask can be any of 4 agency masks or of 12 user created masks. Mean power level, recording transient occurrences, and frequency response are also single-button measurements. All tests can be recorded with a hardcopy output.

# SIGNAL ANALYZERS

## Spectrum Analyzer, 50 kHz to 22 GHz (cont'd)

Model 8592A

### Specifications

#### Frequency

**Frequency Range:** 50 kHz - 22 GHz

Band	N	
0	1-	50 kHz - 2.9 GHz
1	1-	2.75 GHz - 6.2 GHz
2	2-	6.0 GHz - 12.8 GHz
3	3-	12.4 GHz - 19.4 GHz
4	4-	19.1 GHz - 22 GHz

**Frequency Readout Accuracy:**  $\pm(2\%$  of span + 5 MHz) for center frequency  $\leq 2.75$  GHz;  $\pm(2\%$  of span + 0.2% of center frequency) for center frequency  $> 2.75$  GHz

**Frequency Readout Accuracy with CORRECT TO COMB function:**

$\pm(2\%$  of separation between signal and nearest reference frequency + 0.5% of span + 0.007% of reference frequency) for spans  $> 17$  MHz and  $\leq 400$  MHz and no change in center frequency or span

#### Frequency Stability

**Drift (nominal):**  $< 60 \cdot N$  kHz / 5 minutes, after 2-hour warm-up and 5 minutes after setting center frequency

**Noise Sidebands:**  $< -65$  dBc/kHz for (50 kHz-6.2 GHz),  $> 30$  kHz offset, 1 kHz RBW, 30 Hz VBW

**Frequency Span Range:** zero span, 0 - 2.9 GHz, 2.75 - 22 GHz

**Readout Accuracy:**  $< \pm 2\%$  of indicated setting for spans  $> 17$  MHz;  $< \pm 5\%$  of indicated setting for spans  $\leq 17$  MHz

**Bandwidth:** -3 dB nominal

**Resolution:** 1 kHz - 3 MHz in 1,3 sequence

**Video:** 30 Hz - 3 MHz in 1,3 sequence

**Sweep Time Range:** 20 ms - 100 s

**Readout Accuracy:**  $< \pm 10\%$  of indicated setting

**Comb Generator:** 100 MHz Fundamental Frequency

**Frequency Accuracy:**  $\pm 0.007\%$

#### Amplitude Accuracy

##### Frequency Response

Absolute Variation:		
$< \pm 2.0$ dB	50 kHz-2.9 GHz	
$< \pm 2.0$ dB	2.75-6.2 GHz	
$< \pm 3.5$ dB	6.0-12.8 GHz	
$< \pm 4.0$ dB	12.4-19.4 GHz	
$< \pm 5.0$ dB	19.1-22 GHz	

for 10 dB atten., presel peak, Ref. to Cal Out signal, including bandswitching uncertainty

Peak Variation: (Flatness)		
$< \pm 1.0$ dB	50 kHz-2.9 GHz	
$< \pm 1.5$ dB	2.75-6.2 GHz	
$< \pm 2.0$ dB	6.0-12.8 GHz	
$< \pm 2.0$ dB	12.4-19.4 GHz	
$< \pm 2.0$ dB	19.1-22 GHz	

Ref. to midpoint between highest and lowest peak excursions

**Calibrator Accuracy:** 299.9 MHz  $\pm 300$  kHz; -20 dBm  $\pm 1$  dB

**Reference Level Setting:**  $< \pm 1.5$  dB for +30 to -120 dBm (0-60 dB atten.);  $< \pm 1.0$  dB for 0 to -120 dBm (10 dB atten.);  $< \pm 0.5$  dB for 0 to -59 dBm (10 dB atten.)

**Resolution BW Switching:**  $< \pm 0.25$  dB for 3 kHz to 3 MHz

**Log Scale Switching:** No significant error for 1-20 dB/div. scale range

**Log Scale Fidelity:**  $< \pm 0.1$  dB/dB change over 70 dB range;  $\pm 0.75$  dB max. over -60 dB range from Ref. Level

**Linear Accuracy:**  $< \pm 3\%$  of Reference Level setting

**Input Atten Step Accuracy:**  $< \pm 0.5$  dB;  $\leq 60$  dB atten.

(@ 300 MHz)<sup>2</sup>  $< \pm 0.75$  dB;  $\leq 70$  dB atten.

#### General Characteristics

**Temperature:** 0 to +55 C operating; -40 to +75 C storage

**Temperature Stability:** 2 hours after storage at a constant temperature after turn-on at the same constant temperature.

**EMI Compatibility:** CISPR pub. 11(1985) and FTZ 526/527/79

**Audible Noise:**  $< 37.5$  dBA pressure and  $< 5.0$  Bels power (ISO DP7779)

**Power Requirements:** 86-127 or 195-253 V RMS; 47-66 Hz;  $< 160$  VA

**Weight/Size:** 15 kg (33 lbs) 213mm(8.4")H X 366mm(14.4")W X 460mm(18.1")D

**Warranty:** One year limited warranty for materials and workmanship

#### Amplitude

**Amplitude Range:** -109 dBm to +30 dBm

**Readout Resolution (with Markers):**  $< 0.05$  dB for log scale; 0.05% of ref. level for linear scale

**Amplitude Units:** dBm, dBmV, dBuV, volts, and watts

**Amplitude Scale:** log(1-20 dB/div. in 1 dB steps) and linear

**Maximum Safe Input Level**

**Average Continuous Power:** +30 dBm (1 watt, 7.1 Vrms)

**DC:** 0 volts

**Peak Pulse Power:** +50 dBm (100W) for  $< 10$  usec pulse width,  $< 1\%$  duty cycle

**Maximum Dynamic Range:** 70 dB on-screen viewing; 70 dB signal-to-distortion

**Displayed Average Noise:**

-90 dBm - 0.00038% of center frequency	(50 kHz - 5 MHz)
-109 dBm	(5 MHz-2.9 GHz)
-105 dBm	(2.75-6.2 GHz)
-99 dBm	(6.0-12.8 GHz)
-92 dBm	(12.4-19.4 GHz)
-87 dBm	(19.1-22 GHz)

for 0 dB atten., 1 kHz RBW, 30 Hz VBW

**Gain Compression:**  $< 0.5$  dB for -4 dBm total power at input mixer

**Spurious Responses**

**Second Harmonic:**  $< -70$  dBc (10 MHz-2.9 GHz);  $< -100$  dBc<sup>1</sup> ( $> 2.75$  GHz for -40 dBm total power at input mixer)

**Third Order Intermod.:**  $< -70$  dBc (10 MHz-22 GHz) for two -30 dBm signals at the input mixer with  $> 50$  kHz spacing

**Residual Responses:**  $< -95$  dBm (5 MHz-2.9 GHz);  $< -90$  dBm (2.75-6.2 GHz) for 0 dB atten. and 50  $\Omega$  termination on input

**Image, Multiple, and Out-of-Band Responses:**  $< -70$  dBc (50 kHz-2.9 GHz) applied freq.  $\leq 10$  GHz;  $< -70$  dBc (2.75 GHz-22 GHz) applied freq.  $\leq 18$  GHz;  $< -60$  dBc (2.75 GHz-22 GHz) applied freq.  $\leq 22$  GHz

#### Input/Output Characteristics

##### Front Panel Connectors

**Input:** 50 $\Omega$  Type N

**Cal Output:** 50 $\Omega$  BNC, -20 dBm, 299.9 MHz

**1st LO Output:** 50 $\Omega$  SMA, 3.0 - 6.66 GHz

**100 MHz Comb Out:** 50 $\Omega$  SMA, 100 MHz  $\pm 0.007\%$

##### Rear Panel Connectors

**Aux Video Out:** 50 $\Omega$  BNC, 0-1 V

**Monitor Out:** 50 $\Omega$  BNC, NTSC Format, 19.2 kHz horizontal synch.

**High Sweep In/Out:** BNC, high TTL = sweep, low TTL = retrace

**Sweep Output:** BNC, 5K  $\Omega$ , 0 to +10 V ramp

**Aux IF Output:** 50 $\Omega$  BNC, -10 to -60 dBm, 21.4 MHz

**Ext. Trigger Input:** BNC, TTL levels, positive edge trigger

**Interface Connector:** HP-IB(Opt. 021), HP-IL(Opt. 022), RS-232(Opt. 023)

**HP-IB Codes:** SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, C1, C2, C3, & C28

#### Recommended Accessories

**HP 2225A/B/D** Thinkjet Printer

**HP 11694A** 50-75  $\Omega$  Matching Transformer

**HP 85901A** Portable Battery Pack

#### Ordering Information

**HP 8592A** Portable Microwave Spectrum Analyzer

**Option 021:** HP-IB Interface

**Option 022:** HP-IL Interface

**Option 023:** RS232C Interface

**Option 040:** Front Panel Cover

**Option 908:** Rack Mount without Handles

**Option 909:** Rack Mount with Handles

**Option 910:** Extra Operating and Installation

Manuals

**Option 915:** Support Manual and Extra Operating

and Installation Manuals

**Option H25:** 25 GHz upper frequency extension

**Option H50:** CATV personality

**Option H52:** Digital radio personality

**Option K08:** Soft Carrying Case

**Option W30:** Additional Two Years of HP Service

<sup>1</sup>May be below the displayed average noise.

<sup>2</sup>Refer to Installation Manual (08592-90003) and Operation Manual (08592-90005) for more information.

#### Price

\$17,000

\$600

\$600

\$600

\$200

\$250

\$300

\$69

\$64

\$2,500

\$590

\$750

\$250

\$399